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EPIBLEMA SCUDDERIANA (CLEMENS) (LEPIDOPTERA: OLETHREUTIDAE), A WINTER HOST RESERVOIR FOR PARASITIC INSECTS IN SOUTHWESTERN PENNSYLVANIA

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Abstract.—Plakidas, John D., 8506 Forest Avenue, Pittsburgh, Pennsylvania 15237.—*Epiblema scudderiana* (Clemens) was studied for two successive winters 1974–1975 and 1975–1976, to evaluate the moth's economic importance as a winter host reservoir for parasitic insects in Southwestern Pennsylvania. From the collection of 5,609 galls for the two year study, an average of 11.12% primary parasitism was observed. Results reveal that *E. scudderiana* harbors 12 primary parasites, including 6 ichneumonids, 4 braconids, 1 eupelmid, and 1 tachinid. Seven of these parasites are known to parasitize a variety of insect pests during their summer generations. As an economically beneficial winter host reservoir, *E. scudderiana* increases the natality of these parasites during periods when alternate hosts are scarce.

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Introduction

The goldenrod gall moth, *Epiblema scudderiana* (Clemens), forms a thin walled, elliptical gall on the stem of *Solidago graminifolia* (L.). Its distribution ranges from Manitoba (Kearfott, 1905), Massachusetts (Clemens, 1860), Pennsylvania, New York, New Jersey, Ohio, Indiana, Illinois, Iowa and Wisconsin (Heinrich, 1923), to Georgia (Hoffmann, 1945). The moth larva is solitary in existence forming a single celled gall toward the upper half of the stem. I have observed that the larva begins gall formation in June and continues to develop through the summer months thus contributing to the long susceptible stage of the larva to stem boring parasites. The larva overwinters in the last instar and pupates late in April or early in May.

Although it is an abundant moth over its range of distribution there is a limited amount of literature on this insect. However, for the first time a large sample of the population has been studied and the results of the parasite frequencies and their alternate hosts are reported here.

Materials and Methods

Galls were collected in Allegheny, Beaver, and Butler counties in Southwestern Pennsylvania from December 1, through April 15, 1974–1976. The galls were opened and examined in the lab to determine their contents. The recovered gall moth larvae were placed in plastic petri dishes equipped with a cardboard grid composed of 21 individual 15 mm × 15 mm × 10 mm com-

partments. One larva was placed per compartment. All other larvae recovered from the galls were stored in the same manner described above. In order to more closely simulate the natural development of these larvae the petri dishes were stored in a closed metal container and placed outdoors away from direct sunlight until April 15. Following this they were brought indoors and kept at approximately 20°C to allow further development of the larvae. This method of storage proved effective in rearing and observing parasitic activity of the moth larvae, especially in the emergence of endoparasites. Reared adult parasitic specimens were sent to the Systematic Entomology Laboratory, United States Department of Agriculture, Beltsville, Maryland, for identification.

Results and Discussion

In 1974–1975 a total of 4,567 galls were collected having an incidence of 11.37% parasitism. In 1975–1976 1,042 galls were collected having an incidence of 9.98% parasitism. From this sampling of 5,609 galls a combined average of 11.12% primary parasitism was recorded for the two years. In three species hyperparasitism was observed, all by *Perilampus fulvicornis* Ashmead.

The following is a list of the primary parasites, their percent parasitism of the total number of galls collected, and their alternate hosts as reported in the literature.

Ichneumonidae (Hymenoptera).

1. *Scambus pterophori* (Ashmead), 2.78%. Its hosts include, Olethreutidae: *Ancylis comptana* (Froel.), *Carpocapsa pomonella* (L.), *Grapholitha molesta* (Busck), *Epiblema otiosana* (Clemens), *E. strenuana* (Wlkr.), Pyralidae: *Pyrausta nubilalis* (Hbn.), Tortricidae: *Proteoteras aesculana* Riley, (Muesebeck, 1951). Because *S. pterophori* commonly attacks stem boring larvae using as host whatever species is available, there is no apparent synchronizing of its life cycle with that of its host (Cushman, 1926).
2. *Glypta rufiscutellaris* Cresson, 1.1%. Alternate hosts include, Olethreutidae: *A. comptana, C. pomonella, Grapholitha packardii* (Zeller), *G. prunivora* (Walsh), *G. molesta, Laspeyresia caryana* (Fitch), *Melissopus latiferreanus* (Wlsm.), *E. strenuana*, Tortricidae: *P. aesculana,* (Muesebeck, 1951). *G. rufiscutellaris* has been reported as an important parasite of the oriental fruit moth, *G. molesta,* (Merritt, 1933) (Putman, 1935). Its life cycle is not synchronous with that of the moth's (Pepper, 1934). Allen (1930) reports that the ragweed stem borer apparently serves as host for this parasite during periods when other moth larvae are scarce.

3. *Calliephialtes notandus* (Cresson), .84%. Other hosts include, Olethreutidae: *Epiblema desertana* ?, *E. strenuana*, Gelechiidae: *Gnorimoschema gallaesolidaginis* Riley, (Muesebeck, 1951). Summer generations of this parasite have been reported by Leiby (1922) who reared an adult of this species from *G. gallaesolidaginis*.
4. *Scambus* sp. either *granulosis* Wly. or *deceptor* Wly., .41%.
5. *Centeterus linearis* (Provancher), .23%.
6. *Calliephialtes grapholithae* (Cresson), .02%. Other hosts include, Olethreutidae: *C. pomonella*, *E. strenuana*, *G. molesta*, and *L. caryana*, (Muesebeck, 1951). Hamilton (1890) reared this parasite from the hickory shuckworm, *L. caryana*, and Merritt (1933) reared it from the oriental fruit moth. I reared a single male and it would seem that it is merely an accidental parasite of this moth.

Braconidae (Hymenoptera).

7. *Apanteles cacoeciae* Riley, 1.89%. Another reported host, Gelechiidae: *G. gallaesolidaginis*, (Muesebeck, 1951). This was the only gregarious species found to parasitize *E. scudderiana*. It was also hyperparasitized by *Perilampus fulvicornis* Ashmead.
8. *Macrocentrus pallisteri* Degant, 1.4%. Other hosts include, Olethreutidae: *E. otiosana*, *E. strenuana*, and *G. molesta*, (Muesebeck, 1951). Thirty occurances of hyperparasitism by *P. fulvicornis* were recorded here.
9. *Agathis* sp., .94%. Eleven *Agathis* puparia yielded *P. fulvicornis*.
10. *Bracon* sp., .05%.

Eupelmidae (Hymenoptera).

11. *Eupelmus momphae* Gahan, 1.14%. Another recorded host, Olethreutidae: *Epiblema tripartitana* (Zell.), (Muesebeck, 1951). Hoffmann (1945) reared *E. momphae* from a stem boring larva in August, presumably from either *E. tripartitana* or *E. scudderiana*.

Tachinidae (Diptera).

12. *Lixophaga thoracica* Curran, .32%. The biology of this species is poorly understood (Curran, 1931).

Because many parasitic insects do not synchronize their life cycles with that of their host's they must rely on a variety of alternate hosts to maintain establishment within a community. From this study it is evident that *E. scudderiana* is host for a variety of parasites which are not synchronous with its own life cycle. *S. pterophori*, *C. notandus*, *G. rufiscutellaris*, *C. grapholithae*, *E. momphae*, *A. cacoeciae*, and *M. pallisteri*, are all known to utilize a variety of other hosts to maintain a standing population.

Pepper (1934) stated that a study of non-economic insects inhabiting weeds might yield valuable information in the biological control of injurious insects. From these results it is evident that *E. scudderiana* plays an essen-

tial role as a winter host reservoir for some parasitic insects in Southwestern Pennsylvania.

Expanding this concept, it may be advantageous to cultivate this and other suitable species of wild flowering plants in and around orchard and field crops to insure a standing population of specific parasitic insects. This method of cultivating weeds for the purpose of harboring hosts for parasitic species might be termed intercalation. A program utilizing this style of integrated control of insect pests could prove highly affective.

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Literature Cited

Allen, H. W., and E. Lott. 1930. Epiblema strenuana Walk., the host of certain parasites of the oriental fruit moth, Laspeyresia molesta Busck (Lepidoptera). Proc. Entomol. Soc. Wash. 32:135–136.

Clemens, B. 1860. Contributions to American Lepidopterology— No. 6. Proceedings of The Academy of Natural Sciences Philadelphia 12:345–362.

Curran, C. H. 1931. Report on the Diptera collected at the station for the study of insects, Harriman Interstate Park, N. Y. Amer. Mus. Nat. Hist. Bull. 61:21–115.

Cushman, R. A. 1926. Address of the retiring president. Entomol. Soc. Wash. Proc. 28:25–51.

Hamilton, J. 1890. The inhabitants of a hickory nut hull. Entomol. News 1:49–51.

Heinrich, C. 1923. Revision of the North American moths of the sub-family Eucosminae of the family Olethreutidae. Proc. United States Nat. Mus. Bull. 123:1–272.

Hoffmann, C. H. 1945. Insect pests of cultivated goldenrod. J. Econ. Entomol. 38:355–358.

Kearfott, W. D. 1905. Manitoba micro-Lepidoptera. Can. Entomol. 37:205–209.

Leiby, R. W. 1922. Biology of the goldenrod gallmaker Gnorimoschema gallaesolidaginis Riley. Journ. N. Y. Entomol. Soc. 30:81–94.

Merritt, J. M. 1933. Oriental fruit moth parasites in Michigan. J. Econ. Entomol. 26:788–792.

Muesebeck, C. G. W., K. Krombein, H. K. Townes. 1951. Hymenoptera of America North of Mexico. U. S. Dept. Agric., Agric. Monogr. No. 2. 1420 pp.

Pepper, B. B., and B. F. Driggers. 1934. Non-economic insects as intermediate hosts of parasites of the oriental fruit moth. Ann. Entomol. Soc. Am. 27:593–598.

Putmann, W. L. 1935. Notes on the native hosts of some oriental fruit moth parasites. Can. Entomol. 67:46–48.